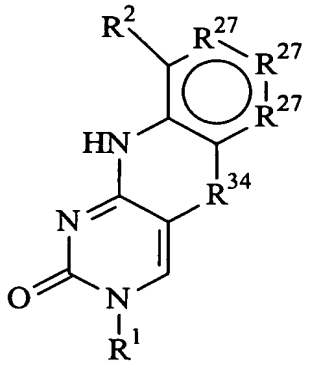
This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended). A compound having the structure (1):



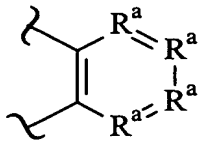
(1)

and tautomers, solvates and salts thereof, wherein

R^1 is an oligonucleotide, a protecting group, a linker or -H;

R^2 is $A(Z)_{X1}$, wherein A is a spacer and Z independently is a label bonding group optionally bonded to a detectable label, but R^2 is not [amine] NH2, protected [amine] NH2, nitro or cyano;

R^{27} is independently -CH=, -N=, -C(C_1-C_8 alkyl)= or -C(halogen)=, but no adjacent R^{27} are both -N=, or two adjacent R^{27} are taken together to form a ring having the structure,



where R^a is independently -CH=, -N=, -C(C_1-C_8 alkyl)= or -C(halogen)=, but no adjacent R^a are both -N=;

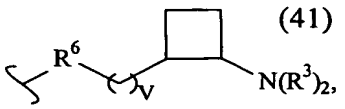
R^{34} is -O-, -S- or -$N(CH_3)$-; and

and X^1 is 1, 2 or 3.

2 (Original). The compound of claim 1 wherein R^2 is -R^{2C}-R^{2D}, wherein R^{2C} is a short spacer chain and R^{2D} is a hydrogen bond donor moiety or a moiety having a net positive charge of at least about +0.5 at pH 6-8 in aqueous solutions.

3. (Currently Amended) The compound of claim 1, wherein R^2 is [-R^6-$(CH_2)_t$$NR^5C(NR^5)(NR^3)_2$,] <u>-$R^6$-$(CH_2)_t$$NR^5C(NR^5)N(R^3)_2$,</u> -$R^6$-$CH_2$-$CHR^{31}$-$N(R^3)_2$, -$R^6$-$(R^7)_v$-$N(R^3)_2$, -$R^6$-$(CH_2)_t$-$N(R^3)_2$, -$(CH_2)_{1-2}$-O-$(CH_2)_t$-$N(R_3)_2$,


(40)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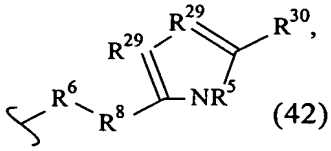
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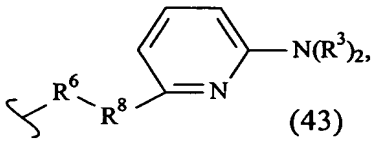
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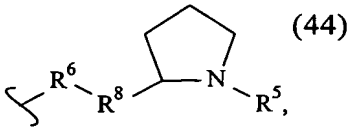
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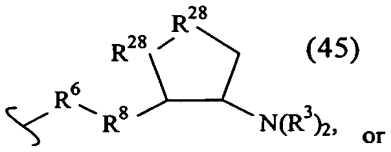
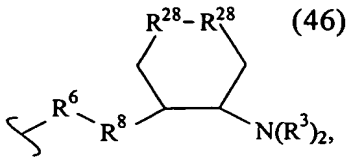
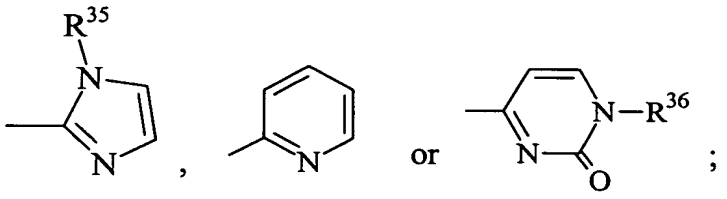

(45) or



(46)

R^3 is independently -H, $-CH_3$, $-CH_2CH_3$, $-(CH_2)_w-N(R^{33})_2$ or a protecting group, or both R^3 together are a protecting group, or when R^2 is $[-R^6-(CH_2)_t-N(R^3)_2,]$ $\underline{-R^6-(CH_2)_t-N(R^{33})_2}$ one R^3 is -H, $-CH_3$, $-CH_2CH_3$, a protecting group or $-(CH_2)_w-N(R^{33})_2$ and the other R^3 is -H, $-CH_3$, $-CH_2CH_3$, $-(CH_2)_w-N(R^{33})_2$, $-CH(N(R^{33})_2)-N(R^{33})_2$,



R^5 is independently H or a protecting group;

R^6 is independently -S-, $-NR^5-$, -O- or $-CH_2-$;

R^7 is independently linear alkyl having 1, 2, 3 or 4 carbon atoms optionally substituted with one $-CH\equiv CH-$, -C=C- or $-CH_2-O-CH_2-$ moiety, or R^7 is cyclic alkyl having 3, 4 or 5 carbon atoms, wherein one of the linear alkyl carbon atoms is optionally substituted with a single $-CH_3$, -CN, =O, -OH or protected hydroxyl, provided that the carbon atoms in any -CH=CH- or $-CH_2-O-CH_2-$ moiety

are not substituted with =O, -OH or protected hydroxyl;

R^8 is linear alkylene having 1 or 2 carbon atoms wherein one alkylene carbon atom is optionally substituted with a single $-CH_3$, -CN, =O, -OH or protected hydroxyl, or R^8 is absent;

R^{28} is independently $-CH_2-$, $-CH(CH_3)-$, $-CH(OCH_3)-$, $-CH(OR^5)-$ or -O-, but both are not -O-;

R^{29} is independently -N-, $-N(CH_3)-$, -CH-, $-C(CH_3)-$, but both are not $-N(CH_3)-$;

R^{30} is -H or $-N(R^3)_2$;

R^{31} is the side chain of an amino acid;

R^{33} is independently -H, $-CH_3$, $-CH_2CH_3$ or a protecting group;

R^{35} is H, C_1-C_4 alkyl or a protecting group;

R^{36} is H, $-CH_3$, $-CH_2CH_3$, a protecting group or an optionally protected monosaccharide;

t is 1, 2, 3 or 4, but when R^6 is -O-, -S- or $-NR^5-$, t is 2, 3 or 4;

v is independently 0, 1 or 2; and

w is independently 1 or 2.

4. (Previously Presented) The compound of claim 3 wherein R^2 is $-CH_2-(CH_2)_tN(R^3)_2$, $-NR^5-(CH_2)_tN(R^3)_2$, $-S-(CH_2)_tN(R^3)_2$, $-O-(CH_2)_tN(R^3)_2$, $[-O-(CH_2)_tNR^5C(NR^5)(NR^3)_2,]$ $\underline{-O-(CH_2)_tNR^5C(NR^5)N(R^3)_2}$, $-(CH_2)_{1-2}-O-(CH_2)_tN(R^3)_2$, $-R^6-CH_2-CHR^{31}-N(R^3)_2$, $-R^6-(R^7)_v-N(R^3)_2$, $[-R^6-(CH_2)_t-NR^5C(NR^5)(NR^3)_2,]$ $\underline{-R^6-(CH_2)_t-NR^5C(NR^5)N(R^3)_2}$, or $[-CH_2-(CH_2)_tNR^5C(NR^5)(NR^3)_2.]$ $\underline{-CH_2-(CH_2)_tNR^5C(NR^5)N(R^3)_2}$.

5 (Original). The compound of claim 4 wherein t is 2.

6 (Original).The compound of claim 5 wherein R^3 independently is -H, $-CH_3$, $-C_2H_5$ or a protecting group.

7 (Original). The compound of claim 6 wherein R^2 is $-O-(CH_2)_2-NH_2$, $-O-(CH_2)_3-NH_2$, $-O-(CH_2)_2-N(CH_3)_2$, $-O-(CH_2)_3-N(CH_3)_2$, $-O-(CH_2)_2-NHCH_3$, $-O-(CH_2)_3-NHCH_3$, $-O-CH_2-CH(CH_3)-NH_2$, $-CH_2-O-(CH_2)_2-NH_2$, $-CH_2-O-(CH_2)_3-NH_2$ or $-(CH_2)_2-O-(CH_2)_2-NH_2$.

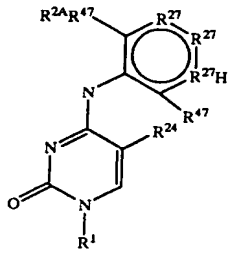
8 (Original). The compound of claim 3 wherein t is 2 or 3.

9 (Original). The compound of claim 1 wherein R^1 comprises -H, an optionally protected monosaccharide, hydroxyl, phosphate or hydrogen phosphonate.

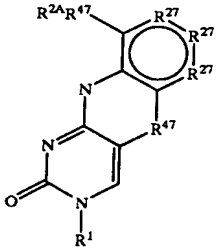
10 (Original). The compound of claim 1 wherein R^1 is optionally protected 2'-deoxy-R^{21}-substituted ribose, 2'-deoxyribose or ribose, wherein R^{21} is H, -OH, halogen or a moiety that enhances the nuclease stability of an oligonucleotide containing the optionally protected 2'-deoxy-R^{21}-substituted ribose, 2'-deoxyribose or ribose.

11 (Currently Amended). The compound of claim 1 having the structure designated by the numbers selected from the group consisting of (104), (105), (133), (134), (111), (112), (113),[(115)] (114), (135), (136), (137), (138), (139), (120), (121), (121A), (143), (122), (123), (125), or (126):

(104)



(105)



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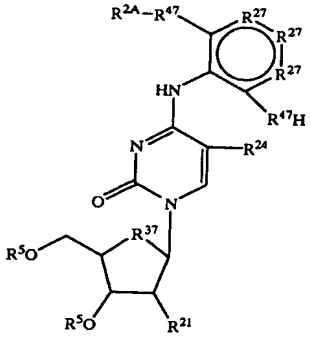
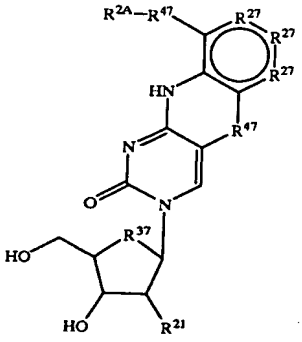


(134)



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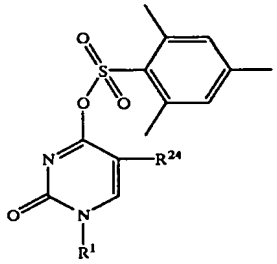
(111)



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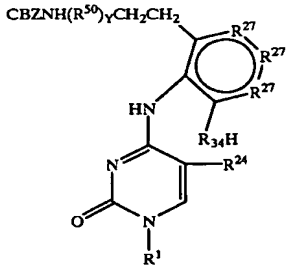

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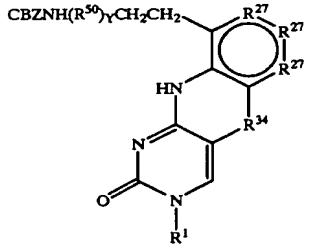
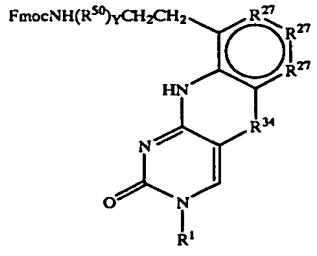


(114)



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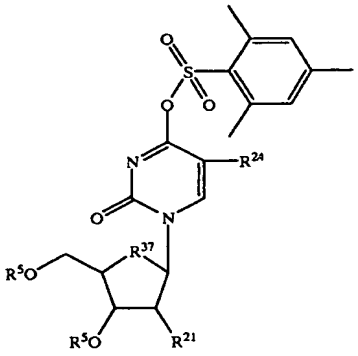
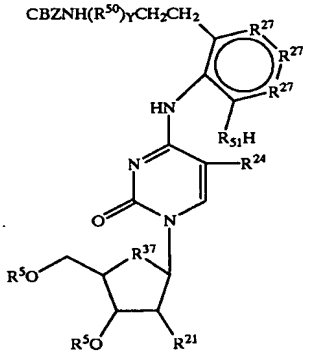
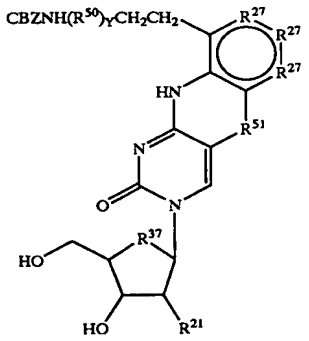
(135)



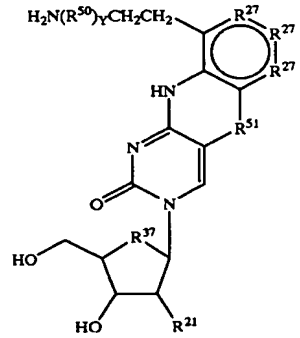
(136)



(137)



(138)



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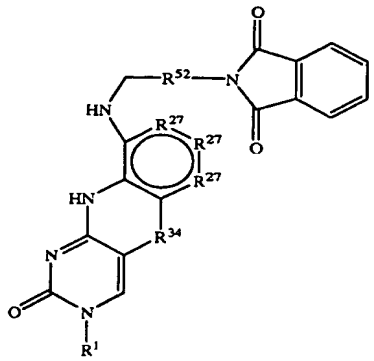
(120)



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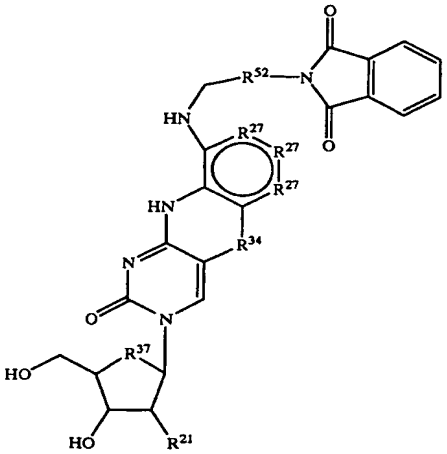

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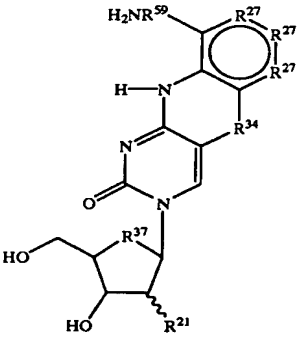

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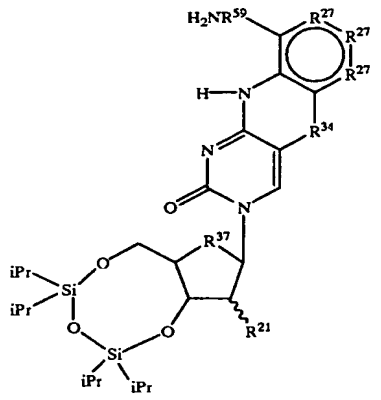
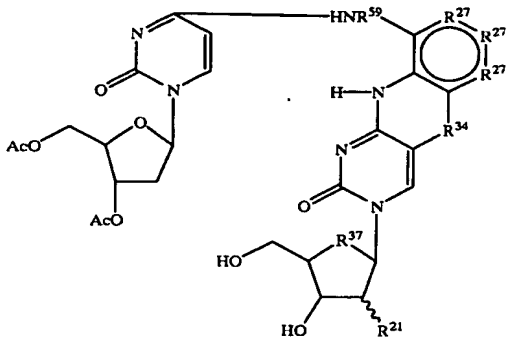
(123)



(126)



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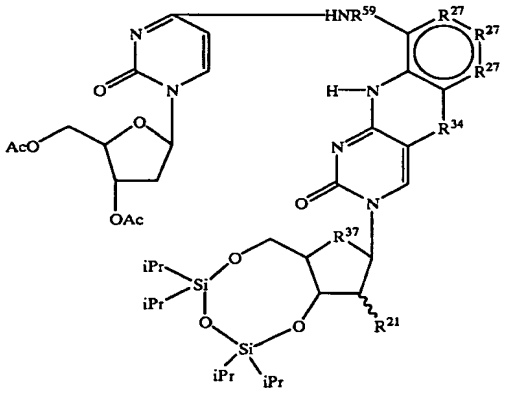
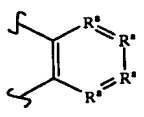


wherein

R^1 is an optionally protected monosaccharide; R^{2A} is -OH; R^5 is independently -H or a protecting group; R^6 is -O-, -S-, -NH- or -CH2-, R^{21} is H, -OH, halogen or a moiety that enhances the nuclease stability of an oligonucleotide; R^{24} is a halogen; R^{27} is independently -CH=, -N=, -C(C_1-C_8 alkyl)= or [-C(halogen =] -C(halogen)=, but no adjacent R^{27} are both -N=, or two adjacent R^{27} are taken together to form a ring having the structure,



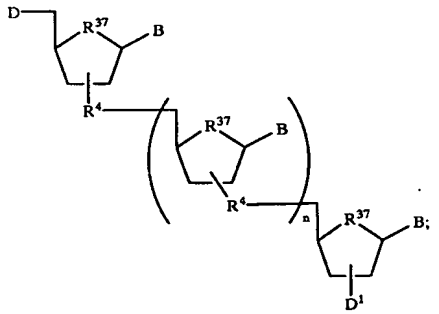
where

R^a is independently -CH=, -N=, -C(C_{1-8} alkyl)= or -C(halogen)=, but no adjacent R^a are both -N=; R^{34} is -O-, -S- or -N(CH_3)-; R^{37} is -O-, -CH_2- or -CF_2-; R^{47} is -O- or -S-; R^{50} is -CH_2-, -C(O)-, -(CH_2)-O-(CH_2)$_2$-, -(CH_2)$_2$-NR^5-(CH_2)$_2$-, -(CH_2)$_2$-S-(CH_2)$_2$-, -CH($N(R^5)_2$)-, -CH ($COOR^5$)- or -C(CH_3)-, -C(C_2C_5)- but adjacent moieties are not C(O); R^{52} is -(CHR^{52A})-(R^{52B})-CHR^{52A}-, - CHR^{52A}-, -O-CHR^{52A}-, -CHR^{52A}-S-CHR^{52A}-, -CHR^{52A}-NR^5-CHR^{52}A-, C_1-C_{10} alkylene optionally substituted with 1 or 2 moieties selected from the group consisting of C_1C_6 alkyl, -OR^5, =O, -NO_2, -N_3, -CN, -$COOR^5$, or -$N(R^5)_2$, wherein any heteroatom is separated from the nitrogen atoms that R^{52} is linked to by one methylene and one or more -CHR^{52A}-; R^{52A} is -H or C_1-C_6 alkyl; R^{52B} is a bond; R^{59} is -R^6-R^{60}-; R^{60} is -(CH_2)$_{Z3}$-(R^{61})$_{Z1}$-(CH_2)$_{Z2}$-; R^{61} is -O-, -S-, -NR^5-, -C(O)-, -CH_2-O- CH_2-, -CH_2-NR^5-CH_2- or CH_2-S-CH_2-; Zl is 0 or 1; Z2 is 1, 2 or 3; Z3 is 1, 2 or 3; Y is 1, 2, 3 or 4; CBZ is carboxybenzoyl; Fmoc is 9-fluorenylmethoxycarbonyl; iPr is isopropyl; and

Ac is acetyl.

12 (Original). The compound of claim 1 wherein R^1 is an oligo-nucleotide having the structure (2):

(2)

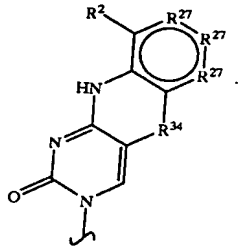


wherein D is -OH, protected -OH, an oligonucleotide coupling group or a solid support;

D^1 is an oligonucleotide coupling group, -OH, protected -OH or a solid support, wherein D^1 is bonded to one 2' or 3' position in the oligonucleotide of structure (2) and the adjacent 2' or 3' position in structure (2) is substituted with R^{21}, provided that D and D^1 are not both an oligonucleoide coupling group or they are not both a solid support; R^4 is independently a phosphodiester linkage or a phosphodiester substitute linkage, wherein R^4 is bonded to one 2' or 3' position in the structure (2) oligonucleotide and the adjacent 2' or 3' position in structure (2) is substituted with R^{21};

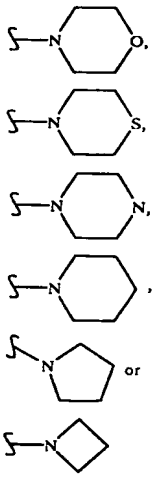
R^{21} is independently -H, -OH, halogen or a moiety that enhances the oligonucleotide against nuclease cleavage; R^{37} is independently -O-, $-CH_2-$, $-CF_2-$; n is an integer from 0 to 98; and

B independently is a purine or pyrimidine base or a protected derivative thereof, provided that at least one B is a base of structure (3)



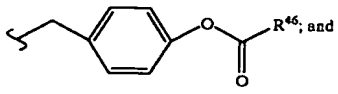
13 (Currently Amended). The compound of claim 12 wherein R^4 is independently 3'-O-P(S)(S)-O-5', 3'-O-P(S)(O)-O-5', 3'-O- P(O)(O)-O-5', 3'-O-P(Me)(O)-O-5', 3'-NH-P(O)(O)-O-5', 3'-S-CH_2-O-5', 2'-S-CH_2-O-5', 3'-O- CH_2-O-5', 2'-O-CH_2-O-5', 3'O-P(Me)(S)-O-5', 3'-CH_2-N(CH_3)-O-5', 2'-CH_2-N(CH_3)-O-5', or 3'-R^{38}-P(N_2)(O)-O-5', wherein R^{38} independently is -O-, $-CH_2-$ or -NH-; R^{39} is a protecting group; [R^{40} independently is hydrogen, a protecting group,

C_1-C_{12} alkyl optionally substituted with one, or two -O-, -C(O)-, -OC(O)-, -C(O)O-, -OR^{42}, -SR^{43}, -$C(O)NR^{39}$-, -$C(O)N(R^{41})_2$, -NR^{41}-, -$N(R^{41})_2$, halo, -CN, or -NO_2 moieties, or both R^{40} together with the nitrogen atom to which they are attached form



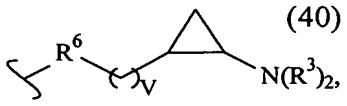
or both R^{40} together are a protecting group;

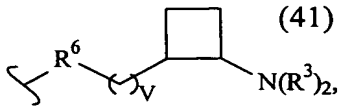
R^{41} independently is hydrogen, a protecting group, alkyl (C_1-C_4 or both R^{41} together are a protecting group; R^{42} is hydrogen or a protecting group; R^{43} is C_{1-6} alkyl or a protecting group; and R^{45} is - H, a counter ion or

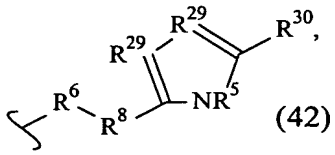


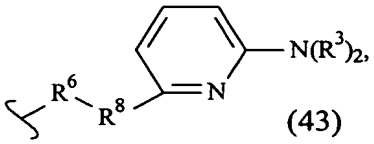
R^{46} is alkyl containing 1-8 carbon atoms.]

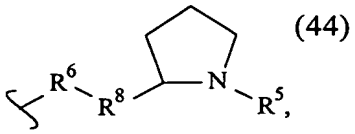
14. (Currently Amended) The compound of claim 12, wherein R^2 is [$-R^6-(CH_2)_tNR^5C(NR^5)(NR^3)_2$,] $\underline{-R^6-(CH_2)_tNR^5C(NR^5)N(R^3)_2}$, $-R^6-CH_2-CHR^{31}-N(R^3)_2$, $-R^6-(R^7)_v-N(R^3)_2$, $-R^6-(CH_2)_t-N(R^3)_2$, $-(CH_2)_{1-2}-O-(CH_2)_t-N(R_3)_2$,

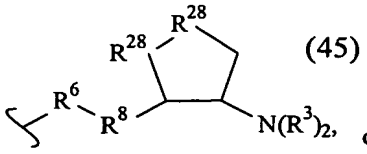

(40)

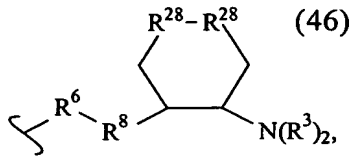

(41)


(42)


(43)

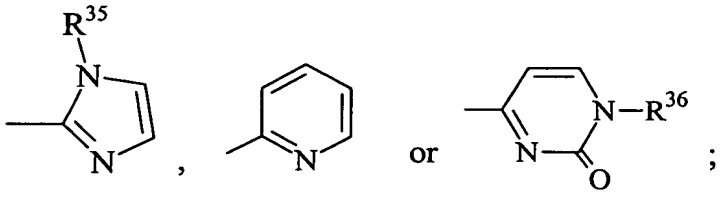

(44)


(45) or



(46)

R^3 is independently -H, $-CH_3$, $-CH_2CH_3$, $-(CH_2)_w-N(R^{33})_2$ or a protecting group, or both R^3 together are a protecting group, or when R^2 is $[-R^6-(CH_2)_t-N(R^3)_2]$ $-R^6-(CH_2)_t-N(R^{33})_2$, one R^3 is -H, $-CH_2CH_3$, a protecting group or $-(CH_2)_w-N(R^{33})_2$ and the other R^3 is -H, $-CH_3$, $-CH_2CH_3$, $-(CH_2)_w-N[R^{33}]_2$, $-CH(N(R^{33})_2)-N(R^{33})_2$,



R^5 is independently H or a protecting group;

R^6 is independently -S-, $-NR^5-$, -O- or $-CH_2-$;

R^7 is independently linear alkyl having 1, 2, 3 or 4 carbon atoms optionally substituted with one $-CH\equiv CH-$, -C=C- or $-CH_2-O-CH_2-$ moiety, or R^7 is cyclic alkyl having 3, 4 or 5 carbon atoms, wherein one of the linear alkyl carbon atoms is optionally substituted with a single $-CH_3$, -CN, =O, -OH or protected hydroxyl, provided that the carbon atoms in any -CH=CH- or $-CH_2-O-CH_2-$ moiety

are not substituted with =O, -OH or protected hydroxyl;

R^8 is linear alkylene having 1 or 2 carbon atoms wherein one alkylene carbon atom is optionally substituted with a single $-CH_3$, -CN, =O, -OH or protected hydroxyl, or R^8 is absent;

R^{28} is independently $-CH_2-$, $-CH(CH_3)-$, $-CH(OCH_3)-$, $-CH(OR^5)-$ or -O-, but both are not -O-;

R^{29} is independently -N-, $-N(CH_3)-$, -CH-, $-C(CH_3)-$, but both are not $-N(CH_3)-$;

R^{30} is -H or $-N(R^3)_2$;

R^{31} is the side chain of an amino acid;

R^{33} is independently -H, $-CH_3$, $-CH_2CH_3$ or a protecting group;

R^{35} is H, C_1-C_4 alkyl or a protecting group;

R^{36} is H, $-CH_3$, $-CH_2CH_3$, a protecting group or an optionally protected monosaccharide;

t is 1, 2, 3 or 4, but when R^6 is -O-, -S- or $-NR^5-$, t is 2, 3 or 4;

v is independently 0, 1 or 2; and

w is independently 1 or 2.

15. (Previously Presented) The compound of claim 14 wherein R^2 is $-CH_2-(CH_2)_tN(R^3)_2$, $-NR^5-(CH_2)_tN(R^3)_2$, $-S-(CH_2)_tN(R^3)_2$, $-O-(CH_2)_tN(R^3)_2$, $[-O-(CH_2)_tNR^5C(NR^5)(NR^3)_2,]$ $\underline{-O-(CH_2)_tNR^5C(NR^5)N(R^3)_2}$, $-(CH_2)_{1-2}-O-(CH_2)_tN(R^3)_2$, $-R^6-CH_2-CHR^{31}-N(R^3)_2$, $-R^6-(R^7)_v-N(R^3)_2$, $[-R^6-(CH_2)_t-NR^5C(NR^5)(NR^3)_2,]$ $\underline{-R^6-(CH_2)_t-NR^5C(NR^5)N(R^3)_2}$, or $[-CH_2-(CH_2)_tNR^5C(NR^5)(NR^3)_2.]$ $\underline{-CH_2-(CH_2)_tNR^5C(NR^5)N(R^3)_2}$.

16 (Original). The compound of claim 15 wherein t is 2 or 3.

17 (Original). The compound of claim 16 wherein R^3 independently is -H, $-CH_3$, $-C_2H_5$ or a protecting group.

18 (Original). The compound of claim 17 wherein R^2 is $-O-(CH_2)_2-NH_2$, $-O-(CH_2)_3-NH_2$, $-O-(CH_2)_2-N(CH_3)_2$, $-O-(CH_2)_3-N(CH_3)_2$, $-O-(CH_2)_2-NHCH_3$, $-O-(CH_2)_3-NHCH_3$, $-O-CH_2-CH(CH_3)-NH_2$, $-CH_2-O-(CH_2)_2-NH_2$, $-CH_2-O-(CH_2)_3-NH_2$ or $-(CH_2)_2-O-(CH_2)_2-NH_2$.

19 (Currently Amended). The compound of claim 12 wherein R^{21} is independently -H, -OH, halogen, protected hydroxyl, -O-methyl, O-ethyl, O-n-propyl, O-allyl, $-O-(CH_2)_2-OH$, $-O-(CH_2)_3-OH$, $-O-(CH_2)_2-F$, $-O-(CH_2)_s-R^{65}$, $-O-(CH_2)_2-[O-(CH_2)_2]_r-R^{65}$, $[-O-(CH_2)_r-O-(CH_2)_r-O-(CH_2)_r-R^{65})]$ $\underline{-O-(CH_2)_r-O-(CH_2)_r-O-(CH_2)_r-R^{65}}$, -NH-methyl, -NH-ethyl, -NH-n-propyl, $-NH-(CH_2)_2OH$, $-NH-(CH_2)_3OH$, $-NH-(CH_2)_s-R^{65}$, -S-methyl, -S-ethyl, -S-n-propyl, -S-allyl, $-S-(CH_2)_2-OH$, $-S-(CH_2)_3-OH$, $-S-(CH_2)_2-F$, $-S-(CH_2)_s-R^{65}$, or $-S-(CH_2)_2-[O-(CH_2)_2]_r-R^{65}$, wherein:

R^{65} is -H, -F, -OH, $-OCH_3$, $-NH_2$, -SH, protected hydroxyl, protected amino or protected thiol;

r is 1, 2, 3, or 4; and

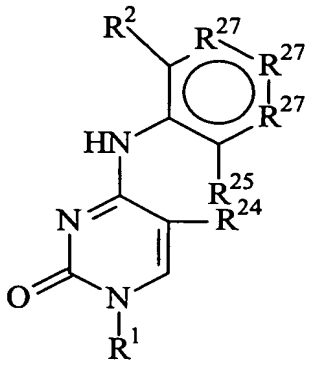
s is 2, 3, 4, 5, 6, 7 or 8.

20 (Original). The compound of claim 19 wherein R^{21} is independently -H, -OH, -F, protected hydroxyl, $-OCH_3$, $-O-CH_2CH_3$, $-O-CH_2CH_2OH$, $-O-CH_2CH_2F$, $-O-CH_2CH_2CH_3$, $-O-CH_2CH_2CH_2OH$, $-O-CH_2CH_2CH_2F$, $-O-CH_2CF_2H$, $-O-CH_2CF_3$ or $-O-CH_2\ CH_2-O-CH_3$.

21 (Original). The compound of claim 12 wherein B independently are selected from the group consisting of a base of structure (3), guanosine, adenine, thymine, uracil, cytosine, 5-methylcytosine, 5-(1-propynyl)uracil, 5-(1-propynyl)cytosine, 5-(1-butynyl)uracil therefor 5-(1-butynyl)cytosine.

22 (Original). The compound of claim 12 wherein D^1 is H-phosphonate, a methylphosphonamidite, a β-cyanoethylphosphoramidite or phosphoramidite.

23 (Original). A compound having the structure (4):



(4)

and tautomers, solvates and salts thereof, wherein

R^1, R^2 and R^{27} have the meanings given in claim 1;

R^{24} is halogen;

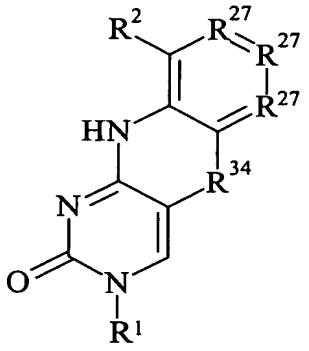
R^{25} is -SH, -OH, =S or =O.

24 (Original). The compound of claim 23 wherein R^1 is -H, or an optionally protected monosaccharide.

25 (Original). The compound of claim 24 wherein the optionally protected monosaccharide is 2'-deoxy-R^{21}-substituted ribose, wherein R^{21} is H, -OH, halogen or a moiety that enhances the nuclease stability of an oligonucleotide containing the optionally protected 2'-deoxy-R^{21}-substituted ribose, 2'-deoxyribose or ribose.

26 (Original). The compound of claim 25 wherein R^{21} is -H, -OH, -F, protected hydroxyl, $-OCH_3$, $-O-CH_2CH_3$, $-O-CH_2CH_2OH$, $-O-CH_2CH_2F$, $-O-CH_2CH_2CH_3$, $-O-CH_2CH_2CH_2OH$, $-O-CH_2CH_2CH_2F$, $-O-CH_2CF_2H$, $-O-CH_2CF_3$ or $-O-CH_2CH_2-O-CH_3$.

27 (Original). A compound having the structure (1):



(1)

or tautomers, solvates or salts thereof, wherein:

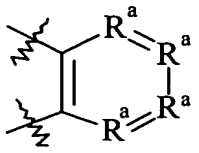
R^1 is a protecting group, an oligonucleotide, a nucleic acid, a polysaccharide, an optionally protected monosaccharide, hydroxyl, phosphate, hydrogen phosphate, halo, azido, protected hydroxyl or -H;

R^2 is $A(Z)_{x1}$, but R2 is not amine, protected amine, nitro or cyano;

R^5 independently H or a protecting group;

R^{27} is, independently, -CH=, -N=, $-C(C_1-C_8$ alkyl)= or -C(halogen)=, but no adjacent R^{27}

are both -N=; or two adjacent R^{27} are taken together to form a ring having the structure:



R^{34} is -O-, -S- or $-N(CH_3)-$;

R^a is independently -CH=, -N=, $-C(C_{1-8}$ alkyl)= or -C(halogen)=, but no adjacent R^a are both -N=;

A is a backbone chain of 2-16 carbon atoms, any 1, 2 or 3 of which are optionally replaced with N, O or S atoms, wherein the backbone chain is optionally substituted independently with 1, 2 or 3 of the following: C_1-C_8 alkyl, $-OR^5$, =O, $-NO_2$, $-N_3$, $-COOR^5$, $-N(R^5)_2$, or -CN groups, C_1-C_8 alkyl substituted with -OH, =O, $-NO_2$, $-N_3$, $-COOR^5$, $-N(R^5)_2$, or -CN groups, or any of the foregoing in which $-CH_2-$ is replaced with -O-, -NH- or $-N(C_1$-C_8 alkyl);

X^1 is 1, 2 or 3;

Y is H, 2-hydroxypyridine, N-hydroxysuccinimide, p-nitrophenyl, acylimidazole, maleimide, trifluoroacetate, an imido, a sulfonate, an imine 1,2-cyclohexanedione, glyoxal or an alpha-halo ketone; and

Z independently is $-NH_2$, -CHO, -SH, $-CO_2Y$, OY.

28 (Original). The compound of claim 27 wherein Z is bonded to a detectable label.

29 (Original). The compound of claim 27 wherein R^1 is an oligonucleotide.

30 (Original). The compound of claim 27 wherein R^1 is an optionally protected monosaccharide.